TITLE

APPARATUS AND METHOD FOR LACING

CROSS REFERENCES TO RELATED APPLICATIONS

[001] This is a continuation of U.S. Patent Application No. 10/295,520 filed on November 14,2002, currently pending, which is a continuation of U.S. Patent Application No. 09/821,815 filed on March 29, 2001, now abandoned, which in turn is a continuation of U.S. Patent Application No. 09/121,722 filed on July 25, 1998, issued as U.S. Patent No. 6,282,817, the entire disclosure of each being incorporated herein.

TECHNICAL FIELD

[002] The present invention relates to apparatus and methods for releasably securing two or more objects, or portions thereof, in proximity with one another by employing at least one lace which is threaded through two or more apertures defined by the objects or portions thereof.

BACKGROUND

[003] Articles which each employ a lacing system to releasably secure two or more portions of the article in proximity with one another have long required that the user tie together the free end portions of a lace which has been threaded through a plurality of eyelets in respective portions of the article. In footwear, for example, the lace typically is first threaded through eyelets in respective halves of an upper portion of the footwear, and the halves are synched together by pulling upon the free end portions of the threaded lace. Once the halves have been synched together as desired the user ties together the free end portions of the lace to prevent the upper portion halves from spreading apart, thereby securing the footwear to the foot. While alternative configurations are known which do not employ a threaded lace to releasably secure two or more portions of an article together, footwear and other articles which employ such a lacing system remain popular for many reasons, including their ability to firmly and adjustably secure portions of the subject article together.

[004] Unfortunately, many articles which employ one or more laces for these purposes put the user to the inconvenience of having to tie the free end portions of the threaded lace together to maintain a secure fit during use of the article. Often, the free end portions become untied

inadvertently, causing the user inconvenience and creating a potentially hazardous condition should the user step upon one of the free end portions while walking or running. Where time is critical, such as for example during athletic competition, the burden of retying the loose free end portions of a shoe lace can prove to be detrimental. To prevent lace from becoming untied during use, multiple knots often are used to tie together the free end portions, which in turn further complicates the process of untying the free end portions and removing the footwear when desired. Moreover, for those who lack the ability or inclination to tie and untie the free end portions of the lace, footwear which incorporates a lace configuration may not be feasible or appealing.

[005] U.S. Pat. No. 3,296,669 to Elder, Jr. discloses footwear which does not require the user to tie the free ends of a shoelace. While the configuration disclosed there has certain advantages over other types of laced footwear, the lacing system described requires the use of fixed tabs at the free ends of the shoelace to prevent the free ends from being pulled through the eyelets when the shoelace is pulled by the user. Such fixed tabs do not enable the user to adjust the length of the shoelace without causing damage to the structure which retains the lace within the eyelets. The disclosed locking device further requires the user to employ sufficient dexterity to align the lace along a path formed by the locking device and to press the lace in between prongs which define the path in order to secure the lace in place.

[006] Thus, a need still exists for efficient lacing apparatus which does not depend upon the user to tie and/or untie the free end portions of the lace and yet permits the free ends of the lace to be rigidly yet adjustably connected to one another while providing the advantages of a threaded lace for securing footwear to a foot.

SUMMARY OF THE INVENTION

[007] This invention is deemed to satisfy this need in a highly efficient and novel way. In one embodiment, this invention provides lacing apparatus which comprises (a) a lace which may be threaded through a plurality of apertures defined by at least two portions of one or more articles; (b) connecting means (e.g., a clamp) for connecting the free ends of the lace to one another, so that when the free ends of the lace are connected to one another, the lace forms a continuous loop; and (c) mechanical locking means (e.g., a wheel lock-type cord fastener) for receiving the lace and releasably locking at least two portions of the lace in proximity to

one another when at least a portion of the lace has been threaded through the apertures and the free ends of the lace are connected to one another. The articles, portions of which define the apertures through which the lace is threaded, may be comprised of a wide variety of objects including virtually anything which may be releasably laced together. Suitable non-limiting examples include bags, blouses, skirts, girdles, footwear, medical support straps, and the like. Footwear is a particularly suitable article, non-limiting examples of which include one or more shoes, boots, sandals, etc. For convenience only, the preferred embodiments of this invention will be illustrated hereinafter as applied to footwear. Preferably, the connecting means is a clamp, and more preferably the clamp comprises two halves of a hollow, open-ended cylinder, each of the two halves being connectable to one another so that, when connected, the halves may form the hollow cylinder, and wherein the clamp further comprises lace retention means (e.g., one or more spiked flanges) for retaining at least a portion of each of the free end portions of the lace within the hollow cylinder. In another preferred embodiment, the clamp further comprises a secondary flange extending radially outwardly from the outer surface of the hollow cylinder for receiving and retaining an unlaced portion of the continuous loop formed by the lace, and one of the halves of the hollow cylinder defines an aperture through which the free ends of the lace may be threaded. In this way, a user may access the free ends of the lace once threaded through the aperture and cut or otherwise remove excess length from the lace to thereby adjust the length of the lace which effectively forms the continuous loop.

[008] Another embodiment of this invention provides footwear which comprises (a) a sole; (b)an upper footwear portion connected to the sole and defining two or more apertures; (c) a lace which may be threaded through the apertures; (d) connecting means for connecting the free ends of the lace together to form a continuous loop; and (e) mechanical locking means for receiving the lace and releasably locking at least two portions of the lace in proximity to one another when at least a portion of the lace has been threaded through the apertures and the free ends of the lace are connected to one another.

[009] In yet another embodiment of this invention, a method of releasably securing two or more objects together is provided. The method comprises (a) threading a lace through (1) mechanical locking means for receiving the lace and releasably locking at least two portions of the lace in proximity to one another and (2) through two or more apertures formed by the

objects, (b) connecting together the free ends of the lace to form a continuous loop, (c) pulling upon the threaded lace so as to bring the objects into proximity with one another, and (d) securing the mechanical locking means so as to releasably lock the lace portions in proximity to one another, thereby inhibiting separation of the objects.

[0010] These and other embodiments and features of the invention will become still further apparent from the ensuing description, appended claims and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a top view in perspective of a shoe which incorporates a preferred lacing apparatus of this invention.

[0012] FIG. 2 is a plan view of a component part of the apparatus of FIG. 1.

[0013] FIG. 3 is a cross-section of the component part of FIG. 2 taken along line 3,3 in FIG. 2.

[0014] FIG. 4 is an elevated view in perspective of the component part of FIG. 2.

[0015] FIG. 5 is a top view in perspective of a shoe which incorporates another preferred lacing apparatus of this invention.

[0016] FIG. 6 is a plan view of a component part of the apparatus of FIG. 5.

[0017] FIG. 7 is a cross-section of the component part of FIG. 6 taken along line 7,7 in FIG. 6.

[0018] In each of the above figures, like numerals are used to refer to like or functionally like parts among the several figures.

DETAILED DESCRIPTION OF THE INVENTION

[0019] As may now be appreciated, this invention enables portions of one or more articles to be brought into proximity with one another and releasably yet securely retained in such position through the use of lace, all without requiring the tying of free ends and without the inconvenience and potential hazard presented by dangling free ends of a lace. The invention also enables the threaded lace to be secured in place efficiently and durably and into the form of a continuous loop to facilitate the use of the lace.

[0020] Referring now to the accompanying drawings, FIGS. 1-4 illustrate a preferred embodiment of this invention. FIG. 1 illustrates one view of apparatus of this invention which has been installed on footwear in the form of a shoe 10, partially broken away. As depicted,

shoe 10 is comprised of a sole 12 and an upper footwear portion 14 connected thereto. Upper footwear portion 14 includes two flap portions 11 and 13, which in turn both include a plurality of eyelets 16 so that portions 11 and 13 define a plurality of apertures 18 through which a lace 20 has been threaded. Lace 20 has two free ends 22,22 which, although not required, are proximate to the front end, i.e., the end opposite from the heel (not shown), of shoe 10, and which are connected to one another by connecting means in the form of a plastic clamp 24, thereby placing lace 20 in the form of a continuous loop. Lace 20 also is threaded through mechanical locking means in the form of a wheel lock-type cord fastener 26, the configuration of which is fully described in U.S. Pat. No. 3,564,670 to Bengtsson. An example of a similarly suitable fastener of this type may be seen in U.S. Pat. No. 5,477,593 to Leick. Fastener 26 receives the lace and is configured to releasably lock at least two portions of lace 20 in proximity with one another, to thereby secure the lace, and in turn the portions of footwear upper portion 14 through which the lace is threaded, together. A loop segment 28 extends from fastener 26.

[0021] With particular reference to FIGS. 2-4 it may be seen that clamp 24 is in the shape of an open-ended hollow cylinder formed from two halves 30 and 32 which are hinged together along respective longitudinal edges so as to pivot relative to one another about a longitudinal axis represented in cross-section on FIG. 3 as pivot point P. Halves 30 and 32 may be clamped together by a snap fit provided by beveled flanges 34 and 36 which extend longitudinally along the respective edges of halves 30 and 32 which are opposite the hinged connection. Clamp 24 further comprises lace retention means in the form of a plurality of spiked flanges 38 which extend from an inner surface 40 of the hollow cylinder formed by halves 30 and 32 into the space S within the hollow cylinder. This particular clamp is especially preferred because it provides the advantage of a streamline connection between the free ends of the lace to prevent hang ups between the clamp and surrounding material during use, and yet it also provides a secure connection between the free ends of the lace. Without being bound by theory, it is thought that the pulling force exerted on the lace and transferred therethrough typically is less inclined to cause this clamp to open inadvertently on account of the linear longitudinal relationship between the lace and the clamp.

[0022] FIGS. 5-7 illustrate another preferred embodiment of this invention. This embodiment differs from that illustrated in FIGS. 1-4 in the design and configuration of clamp 24. As depicted in FIGS. 5-7, half 30 of clamp 24 has been modified so that a secondary flange 42 extends out radially from an outer surface 41 of the hollow cylinder formed by halve 30. In addition, half 30 defines an elongate aperture 44 through which free ends 22,22 of lace 20 are visible in FIG. 6. Flange 42 is curved in cross-section to facilitate the retention of loop segment 28 of lace 20, as seen on FIG. 5. In this way, loop segment 28 may be retained to prevent it from dangling to the side of shoe 10, if desired. Alternatively or in addition, free ends 22,22 may be threaded through aperture 44 and cut to adjust the overall length of lace 20 to thereby reduce the size of loop segment 28, reducing the need to retain segment 28 and prevent it from dangling to the side of shoe 10. It will now be appreciated that the secondary flange may take on one of many forms, and such form is no limitation of this invention so long as the secondary flange is capable of retaining the lace to prevent the loop segment from dangling to the side of the shoe.

[0023] It will be appreciated by those of ordinary skill in the art that the connecting means of this invention may comprise a wide variety of mechanical devices, including but not limited to snaps, male-to-female twist locks, hook-and-loop type material, and the like. Preferably, the connecting means comprises a clamp, as described with particularity above. Those of ordinary skill in the art will also appreciate that the lace retention means of this invention may be comprised of a wide variety of devices, non-limiting examples of which include snaps, hooks, straps, and the like. However, the lace retention means preferably comprises a secondary flange as described in detail above.